Comparison of Recovery Rate of Otomycosis using One-Percent Gentian Violet and One-Percent Clotrimazole Topical Treatment

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ABSTRACT

Background: Otomycosis is a fungal infection of external auditory canal with worldwide prevalence of 9% to 30%. Treatment includes elimination of predisposing factor, thorough canal cleaning and topical or systemic antifungal agents. Clotrimazole is a specific topical antifungal agent with effectiveness varying from 95% to 100%. Gentian violet is an aniline dye and its use as antifungal has been mentioned in literature with effectiveness up to 80%. This study was aimed at comparing the effectiveness of these two commonly used treatments in otomycosis.This is a conducted in Department of ENT-HNS, Patan Academy of Health Sciences, Lalitpur, Nepal over one-year period after approval from institutional review committee. Patients with otomycosis were randomized into arm A and arm B group. Arm A patients were treated with one percent clotrimazole topical drops. Patients in Arm B were treated with application of one percent Gentian Violet paint.

Effectiveness was measured on the basis of clinical response and recovery at end of second week. Data analysis was done with Epi Info application. Chi-square test was used and p-value less than 0.05 was considered significant.

Results: Total 90 patients were treated for otomycosis over one year. Recovery was better in clotrimazole group at second week i.e., 86.84% vs 71.43%.

Conclusions: Clotrimazole was more effective in treatment of otomycosis compared to Gentian Violet paint, though the result was not statistically significant.

Keywords: Antifungal agent; external auditory canal; otalgia.

INTRODUCTION

Otomycosis is a fungal infection of external auditory canal (EAC) with worldwide prevalence of 9 to 30%.[1] A study in India shows prevalence of 40.2%±4.98%.[2] Similar study in Nepal shows prevalence of 8.7%.[3] *Aspergillus* and *Candida* are the commonest organisms.[2,4-15] Presenting symptoms are pruritus, aural fullness, otalgia, discharge and fungal debris in EAC.[1,4,6-11,13-22] Direct microscopy, culture,[2,7,8,12,19,21-23] and histopathology[21,24,25] confirms the diagnosis.

Treatment consists of elimination of predisposing factors, canal cleaning and topical or systemic anti-fungal agents.[1,6,7,9-12,23] Clotrimazole is a specific topical agent with effectiveness of 95%-100%.[26] Gentian violet (GV) is an aniline dye with effectiveness up to 80% as antifungal agent.[10,21,26]

Some studies showed equal efficacy of clotrimazole and other agents,[14,16,17] while others showed clotrimazole as most effective and safe topical antifungal agent.[12,15,18,23] No previous study published before October 2020 is available comparing GV paint and clotrimazole in the treatment of otomycosis as verified through a systematic search conducted for all English-language literature using the electronic databases PubMed, Ovid, Cochrane Library, Medline and Google Scholar with the keywords Antifungal agent, external auditory canal, and otalgia.

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METHODS

This was a cross-sectional study done from October 2020 to October 2021. Study was conducted in Department of Ear Nose Throat-Head &Neck Surgery (ENT-HNS), Patan Academy of Health Sciences (PAHS), Lagankhel, Lalitpur, Nepal after taking approval from institutional review committee (Reference number: PSE2008041405). An informed consent was obtained from all the patients enrolled in the study. Patient with clinical symptoms and signs of otomycosis with proven potassium hydroxide (KOH) mount report and age more than five years were included in the study whereas those with history of co-existent bacterial otitis externa, and/or otitis media, otomycosis along with history of chronic otitis media (chronic discharge from ear) and tympanic membrane (TM) perforations, known immunocompromised condition (uncontrolled DM, Lymphoma, transplantation, receiving Chemotherapy/Radiotherapy, HIV/AIDS, steroids or irradiation) or serious debilitating disease like Tuberculosis or other granulomatous disease, history of external ear anomaly, history of treatment with antifungal agents (i.e., already been under treatment of otomycosis), and history of fungal infection elsewhere in the body (i.e. Onychomycosis, recurrent vaginal infections) were excluded.

The minimal sample size thus determined for each arm was 35. This calculated sample size was further adjusted for acknowledging follow-up loss rate and compliance in line with established statistical reference[29]. A follow-up loss rate of 10% and compliance of 90% were considered to obtain the corrected sample size of 45 in each arm which means the total sample size for this study was 90.

Total 90 patients were enrolled in the study as per minimal sample size. The consecutive patients were assigned serially from one, and block randomization was used as the allocation technique. Sample was collected in ENT-HNS outpatient department (OPD) from external ear with the help of sterile swab stick. The sample was then processed for direct microscopy using 10% KOH which confirmed the diagnosis of otomycosis by demonstration of fungal elements such as septate and aseptate hyphae, yeast cells and conidia formation structure. After diagnosis, patients were allocated into two treatment arms i.e., Arm A and Arm B based on block randomization. Demographic and clinical profiles of patients in both arms were recorded. Elimination of predisposing factors and thorough aural toileting with dry moping, suctioning or syringing was done in all patients. Patient in Arm A was then treated with application of clotrimazole topical drops (1% clotrimazole with 2% lignocaine in propylene glycol base) three drops, three times a day (TDS) for two weeks. First follow up was done in one week in ENT-HNS OPD during which aural toileting was repeated, compliance regarding medication was asked and side effects were checked. Patient in Arm B was treated with application of 1% GV paint over external auditory canal with the help of sterile cotton swab. First follow up was done in one week in ENT-HNS OPD, during which aural toileting was done again, side effects were checked and GV was reapplied. Final follow up was done at the end of second week in both groups during which final data collection regarding clinical features and side effects was done. Effectiveness was measured based upon clinical response i.e., absence of individual clinical features which patient presented with initially and recovery i.e., absence of all clinical features patient presented with at the end of second week. Patient in case if developed side effects like burning, local irritation and allergy before their follow up date was advised to come to ENT-HNS OPD or emergency department of Patan hospital.

Data was analysed using Epi Info application. Unpaired t-test and Chi-square test were used. The test for statistical significance was applied and p-value less than 0.05 were considered significant.

RESULTS

Total 90 patients were diagnosed and treated for otomycosis in between October 2020 to October 2021. Only 38 patients from clotrimazole group and 35 patients from GV group were used in all the final analyses as shown in Figure 1. There was no statistically significant difference amongst the two groups regarding demographic characteristics and laterality as shown in Table 1.

At the end of second week, in clotrimazole treatment group otorrhoea and aural fullness showed complete response i.e., 38 (100%) cases whereas in GV paint group otorrhoea and otalgia showed better response i.e., 32 (91.43%) and 20 (80%) cases respectively as shown in Table 2. Comparison of both groups showed that relief from aural fullness and otalgia was significantly greater while relief from ear itching, otorrhoea and fungal debris had higher trend in clotrimazole group. A higher trend in complete recovery was observed in GV group at first week i.e., 9 (25.71%) cases vs 4 (10.53%) cases, though it was not statistically significant (p=0.0902). Similarly, recovery was better in clotrimazole group at second week i.e.,33 (86.84%) cases vs 25 (71.43%) cases, which was again not statistically significant (p=0.1035). Result of complete recovery amongst the two groups is

shown in Figure 2.

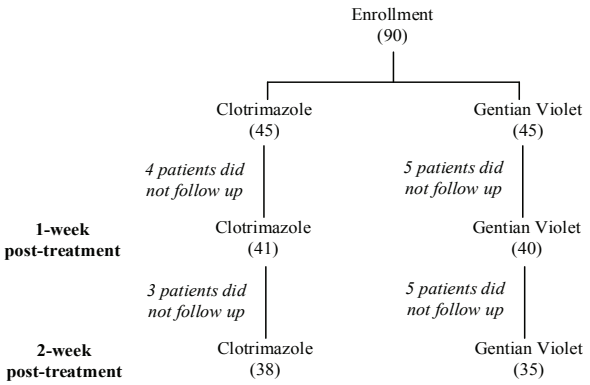

Figure 1. Flow diagram of patients enrolled in the study.

Table 1. Demographic characteristics of patients.

Demographic characteristics		Clotrimazole	Gentian Violet	p value
Age in years (Mean±SD)		37.63±18.48	36.0±16.62	0.6937 *
Gender	Male (%)	19 (50.0)	17 (48.57)	
	Female (%)	19 (50.0)	18 (51.43)	0.9029 **
Side	Right	21 (55.26)	14 (40.0)	0.3266 **
	Left	14 (36.84)	19 (54.29)	
	Bilateral	3 (7.9)	2 (5.71)	

** Test applied is Unpaired T-test*

*** Test applied is Chi-square test*

Table 2. Clinical features among patients 2 weeks after treatment.

Clinical feature		Drug		p value*
		Clotrimazole (%)	Gentian violet (%)	
Ear itching	Yes	4 (10.53)	9 (25.71)	
	No	34 (89.47)	26 (74.29)	0.0902
Aural fullness	Yes	0 (0)	8 (22.86)	
	No	38 (100)	27 (77.14)	**0.0018**
Otorrhoea	Yes	0 (0)	3 (8.57)	
	No	38 (100)	32 (91.43)	0.0653
Otalgia	Yes	1 (2.63)	7 (20)	
	No	37 (97.37)	28 (80)	**0.0176**
Fungal debris in external auditory canal	Yes	4 (10.53)	10 (28.57)	
	No	34 (89.47)	25 (71.43)	0.0504

** Test applied is Chi-square test; N = 73*

Bold signifies statistically significant (p=0.05)

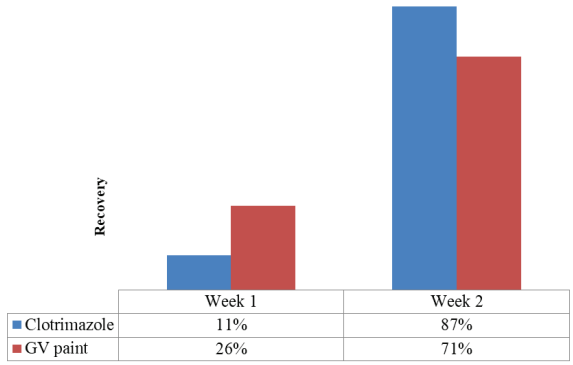

Figure 2. Complete recovery within 2 weeks.

DISCUSSION

Otomycosis is a frequently encountered superficial fungal infection of the external auditory canal.[2] Prevalence is influenced by geographical area; being more common in tropical and subtropical humid climates.[1] *Aspergillus* and *Candida* spp. are by far the commonest ones. [2,4-15] Causative agent identification was not done in our present study. Predisposing factors are high degree of humidity and heat as in summer and autumn, dusty environment, low socio-economic status, habit of cleaning ears with match-stick, contaminated fingertips, instillation of oils, antibiotics/steroid drops, wax solvents, poor personnel hygiene, bacterial infection (AOM/COM), failure in ear's defence mechanisms (i.e., changes in coating epithelium due to dermatological diseases or micro trauma, changes or increase in PH, quantitative and qualitative changes in ear wax), use of hearing aid or hearing prosthesis, self-inflicted trauma, swimming, immunocompromised states, head cover, post-surgical mastoid cavity, dermatomycosis in other body parts, hormonal changes, entry of foreign body into the ear canal, traumatic insemination of wood particles, plant materials and dirt into the ear.[2,7,10,16,19,20,23,25] We did not analyse all the predisposing factors in our study.

Typical presenting symptoms are pruritus, discomfort, aural fullness, otalgia, discharge, hearing loss and tinnitus.[1,4,6-11,13-22] Aural fullness and otalgia was the most common presenting feature in the present study, in 83.56% of cases, which is similar to study by Khan et.al,[1] Navaneethan et.al[14] and Kaur et.al.[8] However other investigators have reported that itching was the more common symptom in their studies,[2,3,6,7,12,17-19,23] which was present in 78% of cases of our present study. Otomycosis is most frequent in adults than in children.[1,2,4,8,9,17-20] The cause of this could be more

outdoors time spend by young adults [4] and also this is the most active phase of life.[19] The most common age group in present study was 25-35 years (32.8%), which is same as that of above studies. In the present study, otomycosis was equal among male and female which is same as other studies.[10,17,19,23]

There was no statistically significant difference regarding the demographic characteristics among the two treatment groups.

Study by Edward et.al[10] reported a single case which had been treated with GV paint and response was noticed in 7 days. In present study clotrimazole showed resolution of 89.47%, 100%, 100%, 97.37% and 89.47% of ear itching, aural fullness, otorrhoea, otalgia and fungal debris in EAC respectively compared to resolution of 74.29%, 77.14%, 91.43%, 80% and 71.43% of itching, aural fullness, otorrhoea, otalgia and fungal debris in EAC among GV group at the end of second week. Higher trend in complete recovery was observed in GV group at first week while recovery was better in clotrimazole group at second week. Present study has some limitations. This is a single centre study, so the findings of this study could not be generalized to the entire population of the country and may not reflect the actual scenario. It has short duration of follow-up due to which relapse could not be recorded and analysed.

CONCLUSIONS

Clotrimazole was more effective in treatment of otomycosis compared to GV paint, though result was not statistically significant. Further study is needed with longer duration of follow up and confirmation of success of treatment by negative KOH mount or negative fungal culture to find adequate dose and duration of treatment along with incidence and risk factors for recurrence.

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